

What is claimed is:

1. An isolated ZAP protein.
- 5 2. The protein of claim 1, wherein the protein is a human ZAP protein.
3. The protein of claim 1, wherein the protein is a rat ZAP protein.
- 10 4. The protein of claim 1, wherein the protein is a mouse ZAP protein.
5. The protein of claim 1, wherein the protein comprises the amino sequence set forth in SEQ ID NO: 1.
- 15 6. The protein of claim 1, wherein the protein has deleted from it a region which causes protein instability.
- 20 7. The protein of claim 6, wherein the region is the WWE region.
- 25 8. An isolated nucleic acid which encodes a ZAP protein.
9. The nucleic acid of claim 8, wherein the nucleic acid is DNA.
- 30 10. The DNA of claim 8, wherein the DNA is cDNA.
11. The cDNA of claim 10, wherein the cDNA comprises the nucleic acid sequence set forth in SEQ ID NO: 2.

12. The DNA of claim 9, wherein the DNA is a genomic DNA.
- 5 13. The nucleic acid of claim 8, wherein the nucleic acid is RNA.
14. The nucleic acid of claim 8, wherein the ZAP protein is a human ZAP protein.
- 10 15. The nucleic acid of claim 8, wherein the ZAP protein is a rat ZAP protein.
- 15 16. The nucleic acid of claim 8, wherein the ZAP protein is a mouse ZAP protein.
17. The nucleic acid of claim 8, wherein the protein has deleted from it a region which causes protein instability.
- 20 18. The nucleic acid of claim 17, wherein the region is the WWE region.
19. The nucleic acid of claim 8, wherein the nucleic acid is labeled with a detectable marker.
- 25 20. The nucleic acid of claim 19, wherein the detectable marker is a radioactive label, a calorimetric marker, a luminescent marker or a fluorescent marker.
- 30 21. An expression vector comprising a nucleic acid sequence encoding a ZAP protein.

22. A host vector system which comprises the vector of claim 21 and a suitable host cell.
23. The host vector system of claim 22, wherein the host cell is a eukaryotic, bacterial, insect or yeast cell.
24. The host vector system of claim 23, wherein the host cell is a eukaryotic cell.
25. The host vector system of claim 24, wherein the host cell is a mammalian cell.
26. A method for increasing the amount of ZAP protein in a mammalian cell which comprises contacting the cell with a ZAP protein under conditions permitting entry of the ZAP protein into the cell, so as to thereby increase the amount of ZAP protein in the mammalian cell.
27. A method for increasing the expression of ZAP protein in a mammalian cell which comprises introducing into the cell an expression vector comprising a nucleic acid sequence encoding a ZAP protein, so as to thereby increase ZAP protein expression in the mammalian cell.
28. The method of claim 27, further comprising the step of detecting the increase in ZAP protein expression by detecting a difference in the amount of ZAP protein-encoding mRNA in the mammalian cell before and after introduction of the expression vector into the cell.

29. A method for increasing resistance to a virus in a mammalian cell which comprises contacting the cell with a ZAP protein specific for that virus under conditions permitting entry of the ZAP protein into the cell, so as to thereby increase resistance to the virus in the cell.
30. The method of claim 29, wherein the mammalian cell is a human cell.
31. The method of claim 29, wherein the virus is an alpha virus.
32. The method of claim 29, wherein the virus is West Nile virus.
33. A method for increasing resistance to a virus in a mammalian cell which comprises introducing into the cell an expression vector comprising a nucleic acid sequence encoding a ZAP protein specific for that virus, so as to thereby increase resistance to the virus in the mammalian cell.
34. The method of claim 33, wherein the mammalian cell is a human cell.
35. The method of claim 33, wherein the virus is an alpha virus.
36. The method of claim 33, wherein the virus is West Nile virus.
37. A method for increasing the amount of ZAP protein in a subject's cells which comprises administering to

the subject an amount of ZAP protein effective to increase the amount of ZAP protein in the subject's cells.

5 38. The method of claim 37, wherein the subject is a human.

39. A method for increasing resistance to a virus in a subject which comprises administering to the subject
10 an amount of ZAP protein specific for that virus effective to increase the amount of ZAP protein in the subject's cells, so as to thereby increase resistance to the virus in the subject.

15 40. The method of claim 39, wherein the subject is a human.

41. The method of claim 39, wherein the virus is an alpha virus.

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42. The method of claim 39, wherein the virus is West Nile virus.

25 43. A method for determining whether an agent increases ZAP protein expression in a mammalian cell which comprises:

- (a) contacting the cell with the agent under conditions permitting ZAP protein expression;
- (b) determining the resulting amount of ZAP protein
30 expression in the cell; and
- (c) comparing the amount of expression determined in step (b) with the amount of ZAP protein expression determined in the absence of the agent, whereby a greater amount of ZAP protein

expression in the presence of the agent relative to that in the absence of the agent indicates that the agent increases ZAP protein expression in a mammalian cell.

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44. The method of claim 43, wherein determining the resulting amount of ZAP protein expression in step (b) is accomplished by determining the amount of ZAP protein-encoding mRNA in the mammalian cell.

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45. The method of claim 43, wherein the agent is a ZAP protein having deleted from it a region which causes protein instability.

15 46. The method of claim 45, wherein the region is the WWE region.

47. A method for determining whether an agent increases resistance to a virus in a mammalian cell, which comprises:

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(a) contacting the agent with a mammalian cell having introduced thereto an expression vector comprising a nucleic acid sequence corresponding to the virus operatively linked to a reporter sequence whose expression in a mammalian cell gives rise to a detectable signal, wherein RNA corresponding to the virus is known to be degraded by a ZAP protein present in the cell;

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30 (b) determining the amount of signal produced in the cell by the reporter sequence after contact with the agent; and

(c) comparing the amount of signal determined in step (b) to that produced in the absence of the

agent, whereby the amount of signal produced in the presence of the agent being less than that produced in the absence of the agent indicates that the agent increases resistance to the virus in the cell.

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48. The method of claim 47, wherein the agent is a ZAP protein having deleted from it a region which causes protein instability.

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49. The agent of claim 48, wherein the region is the WWE region.

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50. The method of claim 47, wherein the reporter sequence is lacZ.

51. The method of claim 47, wherein the virus is an alpha virus.

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52. The method of claim 47, wherein the virus is West Nile virus.

53. A composition comprising a ZAP protein and a pharmaceutically acceptable carrier.

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54. A composition comprising an expression vector comprising a nucleic acid sequence encoding a ZAP protein, and a pharmaceutically acceptable carrier.

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55. An article of manufacture comprising a packaging material having therein a ZAP protein and a label indicating a use for the ZAP protein for increasing resistance to a virus in a subject.

56. An article of manufacture comprising a packaging material having therein an expression vector comprising a nucleic acid sequence encoding a ZAP protein, and a label indicating a use for the expression vector for increasing resistance to a virus in a subject.

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